INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 13, n. 2, March-April 2022
ISSN: 2236-269X
DOI: 10.14807/ijmp.v13i2.1545

ECONOMIC AND NON-ECONOMIC DETERMINANTS OF ECONOMIC GROWTH IN BANGLADESH: MULTIVARIATE REGRESSION ANALYSIS

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Submission: 1/8/2021
Revision: 9/17/2021
Accept: 12/9/2021

ABSTRACT

This study focuses on the scenario of the economic development of Bangladesh. The major objective of the study is to examine the economic and non-economic determinants of the economic growth of the country. This study employs the Multivariate OLS regression and GLM technique to explore the influences of those variables to the economic growth and development of the country. The empirical results show that agriculture, industry, and service sector contribution to real GDP are positive where industry and service sectors are statistically significant. The results of the economic determinant model illustrate that the capital, labor forces, imports, and total reserve of the country positively influence the economic development of the country which are significant also. The OLS estimation shows that coefficients of non-economic determinants such as control of corruption and bureaucratic quality are positively significant to influence the economy. The results also present that internal conflict, democratic accountability, and rule and order situation negatively affect the economic growth in Bangladesh. The GLM estimation shows the control of corruption, rule, and order also a positive effect on economic growth. These empirical findings are consistent with the exploratory analysis and practices.

Keywords: Economic Determinants; Non-Economic Determinants; Governance Quality; Infrastructure; Economic Growth; Multivariate OLS

1. INTRODUCTION

When after a bloody war, Bangladesh became independent in 1971, many world-famous politicians and economists suspected the long-term economic viability of the nation. For example, Henry Kissinger, the then USA secretary of state, mocked at Bangladesh calling it a ‘‘basket case’’ which refuted any possibility of development for Bangladesh. Then Faaland

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and Parkinson (1976), two renowned world economists, said that any country could develop if a country like Bangladesh develops.

During the war of liberation, most of the roads, highways, railways, bridges, power plants, and overall infrastructures were destroyed by the military of Pakistan. As a result, Bangladesh faces a tough challenge soon after independence. For many years the economy has to suffer the pain of the war. It took so much time and effort for the restoration of the economy of Bangladesh. According to Paci and Sasin (2008), the country has to depend much on the hard work of its people as the natural resources are not in abundance.

The World Development Report-2019 commented on the social and economic progress of Bangladesh that several countries have done well in human development aspects, and others have done well in economic indicators, but Bangladesh belongs to a rather few groups of countries that have done well on both aspects (World Bank, 2019).

Table 1: Selected Development Indicators of Bangladesh Economy, 1975-2018

Indicators	1975	1990	1995	2000	2005	2010	2015	2018
Population (Millions)	**72.27**	**100.73**	**119.86**	**132.38**	**143.13**	**151.12**	**157.9**	**161.4**
Population Growth Rate (Annual)	1.93	2.46	2.11	1.84	1.34	1.08	1.13	1.048898
GDP Per Capita ($ US)	268.4	280.57	316.51	355.97	421.12	762.8	1385	1906.049
GDP Growth Rate (Average. Annual %)	-4.09	5.94	4.92	5.94	5.95	5.57	6.55	8.13
Infant Mortality (Per 1000 birth rate)	145	100	81	65	51	39	30	26.84
Labor Force Participation (Million)	n/a	47.17	53.04	58.99	66.49	73.01	77.61*	58.505
Life Expectancy at Birth (Total Years)	49.06	60.53	62.69	65.32	67.49	69.49	72	72.15
Unemployment Rate (% of Total. Labor For)	n/a	3.6	2.9	3.3	4.3	4.5	4.3	4.384
Urban Population (% of Total)	9.84	19.81	21.69	23.59	26.8	30.46	33.5	38.85
Poverty Rate (% of Total Population)		58.6		48.9	40	31.5	24.3	21.8
Populations Density (S.Km)	548	816	912	1011	1102	1169	1238	1265.036
Human Development Index Value	n/a	0.386	0.423	0.468	0.506	0.545	0.579	0.614

Source: World Bank-WDI (2019), Bangladesh Bureau of Statistics (BBS), 2019

Now Bangladesh is a growing developing economy in the South Asian region, having a growth of GDP of more than 6% in a recent decade meaning that over the period 2008 to 2018, the average GDP growth rate of Bangladesh is more than 6%. The economy of the country is market-based which is increasingly led by export-oriented industrialization. Bangladesh is classified as a Next-11 emerging market and one of the Frontier Five (Wilson & Stupnytska, 2007). According to a recent survey poll, Bangladesh has the second most pro-

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capitalist population in the developing world. Bangladesh is the most supportive free-market and trade-oriented country in South Asia, according to the research conducted by the US-based Pew Research Centre.

It is widely recognized that Bangladesh is doing better according to some socio-economic development indicators such as remarkable reduction of infant mortality, increased life expectancy, labor participation especially women participation in the labor force, decreased population growth rate, increase in GDP per capita, and expansion of total urbanization which are shown in Table 1. In Table 1, it is observed that the total population of the country increases to 347.99 million in 2019 where in 1975, it was 72.27 million. But the annual population growth rate declines to 1.04 in 2018 from 1.93 in 1975. The GDP growth rate was extremely low over the years, varying from a negative value to about 4.09% in 1975.

However, at present in the 2018-19 and 2019-2020 fiscal years, it increases to 7.86% and 8.13% respectively. After a long time, Bangladesh achieves more than 7% of the GDP growth rate in 2016-2019 which is a sign of a good economic situation in the country. It is also seen from the table that the country achieves her target of MDGs in the cases of infant mortality and life expectancy. The poverty reduction in Bangladesh is remarkable too. Bangladesh has already achieved the MDGs target of poverty reduction in 2015. In 1990, the poverty rate was 58.6% of the total population of the country.

Now in 2018, it is around 21.8% of the total population. The value of the human development index (HDI) is also improving in recent years which are also shown in Table 1. The logical statement is that it is necessary to know the impact of each determinate to accelerate economic growth (Próchniak, 2011; Acs, 2018; Pegkas, 2018). The current study will help to measure the importance of each economic and non-economic determinant.

The main objective of this study is the critical analysis of the determinants of economic development in Bangladesh. It will find out which factors of social and development is influential by using exploratory research. At the same time, this study analyzes the economic and noneconomic determinant to influence the economic growth rate. The study employs both exploratory and empirical analyses to explore the economic development of the country. To attain the target, the study also uses a multivariate OLS regression model and GLM to examine the determinants of the economic growth in Bangladesh.

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The paper consists of eight sections. The first section forms the introduction which is followed by a literature review in section 2 and the methods of the study illustrated in section 3. The economic growth experienced in Bangladesh is discussed in section 4. The sector-wise contribution in the economy is mentioned in section 5. Section 6 contains the determinants of the economic growth of Bangladesh. Section 7 and 8 are presented the econometric model specification and empirical analysis respectively. Finally, the conclusion and recommendations of the study appear in section 9.

2. LITERATURE REVIEW

A study about the non-economic determinants of economic growth in Bangladesh is scarce. Most of the researchers have done the research on the effects of exports, imports, exchange rate, education, government expenditure, financial development, inflation, capital, labor forces, and remittance on the economic growth in Bangladesh. Very few of the researchers have examined the sector-wise contribution to the economic growth in the country. Some of the researchers investigate the impact of FDI on economic growth where they get a positive result.

But as far as the author knows, not about of effects of non-economic determinants such as control of corruption, bureaucratic quality, democratic accountability, the role of law and order situation, internal conflict on the economic growth in Bangladesh is examined. These non-economic determinants of economic growth are influential factors also but somehow it is ignored by the researchers from Bangladesh's perspective.

The study will use the secondary data to explore the relationships among the variables by using the multivariate OLS regression model and the Generalized Linear Model (GLM) method. Whatever, this econometric method gives the uniqueness of this study. The current study also emphasized how the economic development of the country will be benefited from these economic and non-economic determinants.

Table 2: Summary of the Literature Review on the Determinants of Economic Growth

Authors' Name	Country, Time	Methods	Variables	Findings
Sharma (2018)	India, 1980-2016	OLS Model	GDP Growth, Exports, FDI, Total Expenditure, Gross Domestic Investment, Inflation	Exports and local investment are the major and significant components of the industrial sector while exports and inflation are significant factors for the service sector growth rate.

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Sharma et al. (2018)	India, 1971-2016	ARDL Technique	GDP Per Capita, Foreign Aid, Govt. Consumption Expenditure, FDI, Trade Openness, Exchange Rate, Human Capital, Inflation,	The results have found that foreign aid, government size, and FDI have positive and significant effects on the economic growth in India while the exchange rate and human capital have negative effects.
Ali and Saif (2017)	Pakistan, 1976-2015	Cointegration Technique, VECM, IRF, VD	Economic Growth (GDP), FDI, Agriculture Rate, Energy Consumption, Trade Openness	Results illustrate that there is a positive impact of agriculture contribution, energy consumption, trade openness, and FDI on the economic growth of the country.
Islam (2014)	Bangladesh, 1973-2010	Cointegration, Granger Causality test, ECM	Economic Growth (GDP), Education, Revenue Expenditure, Development Expenditure, Total Education Expenditure, Human Development,	Johansen's cointegration test suggests that there is a long-run relationship between education and economic growth in Bangladesh. There exists uni-directional causality from GDP to education.
Aziz & Hossain (2012)	127 countries, 2000-2010	Cross-sectional Study	Per Capita GDP (PPP), Labor Force, Capital, Human Capital, Polity Score, Non-corruption Score	Democracy is a negatively effects on the economic growth of the study countries while polity has a positive influence.
Rahman et al. (2011)	Bangladesh, 1972-2008	Cointegration, Granger Causality Test	GDP, Agriculture, Industry, Service sector Contribution to GDP	Their results show that uni-directional causality from industry to agriculture sector and GDP to the service sector.
Rao and Hasan (2011)	Bangladesh,	ARDL Model	TFP, Trade Openness, FDI, Development in the Financial Sector	All independent variables enhance the total factor productivity in the country.
Ahmed and Uddin (2009)	Bangladesh, 1976-2005	Johansen Cointegration Test	Real GDP, Export, Imports, Remittance	They have found the short-run causal relation among exports, imports, remittance, and economic growth.
Shahbaz et al. (2008)	Pakistan, 1991-2007	Simple Linear Regression & ARDL Model	Per Capita GDP, Financial Development, FDI, Trade Openness, Inflation, Remittances, Domestic Investment	There are long-run relations among the variables. Remittance is positively enhanced by economic growth.

Source: Author's Collection

3. METHODOLOGY

This study uses both exploratory and empirical analysis. Firstly, it explores the present economic development situation of the country using a qualitative and quantitative technique in sections 3, 4, and 5. Then it examines the empirical relationship of the determinants of real GDP by using the multivariate OLS regression models. Basically, four types of regression models are used to assess the study.

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First one is the sector contribution such as agricultural, industrial and service sector to real GDP, the second one is employment effects such employment in agriculture, industry on real GDP, the third one is economic determinants i.e., capital accumulation, labor forces, exports, imports, infrastructure development, and total reserve of real GDP and the fourth one is non-economic determinants i.e., control of corruption, bureaucratic quality, internal conflict, law and order, democratic accountability of real GDP.

The time period of the study is 1972-2018. But non-economic determinants of GDP data are available only 1984 to 2018. The annual time series data are taken from the World Development Indicators-2019 of World Bank, International Country Risk Guide (ICRG), and Bangladesh Economic Review of Ministry of Finance, Bangladesh. The sources of the data are well recognized and therefore credible.

4. ECONOMIC GROWTH EXPERIENCES IN BANGLADESH

Some significant changes in the economy of Bangladesh have been noticed since the early nineties of the last century such as macroeconomic stability and successive economic growth, though Bangladesh has encountered the global financial crisis and natural disasters (Bhattacharaya & Chowdhury, 2003).

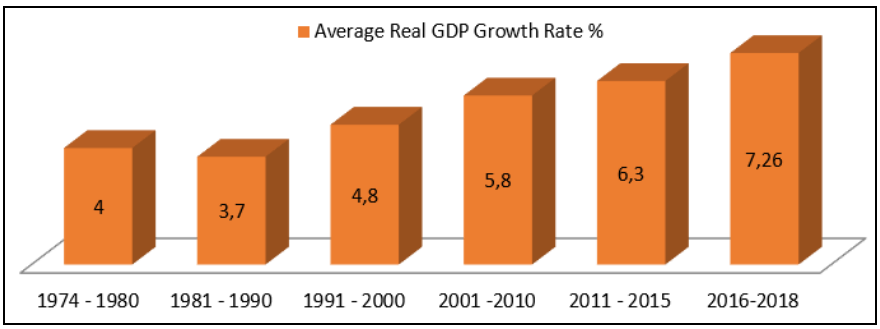

Figure 1: Real Growth Rate of GDP in Bangladesh (as %, Average)
Source: World Bank-WDI (2019), Bangladesh Bureau of Statistics (BBS), 2019

The growth rate of GDP in Bangladesh was very low till 1990 after which it started to increase. From Figure 1, it is seen that the real GDP growth was only 1.04% in 1971-1980 which is much lower than in other decades. It is the only reason that during that time, the post-war economy of the country has to go through many barriers. Even at that time, there was some negative GDP growth rate. As in 1972 and 1975, the GDP growth rate was -13.97% and -4.09% respectively.

After the open economy in the country in the nineties, there has been a significant increase in GDP growth rate which has shown in Figure 1. In addition, in the 1990s,

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government authority has taken some economic reforms in macroeconomics sectors accelerated GDP growth. GDP growth rate accelerates significantly over 1990-2000 and 2001-2010 when the average growth rate was at 4.8% and 5.75% respectively and up to 2016-18 growth rate increase by 7.26%.

4.1. Sector-Wise Contribution to the Economy

The sector-wise value added to the economy has changed significantly over the past four decades (Figure 2). The value-added (% of GDP) of agriculture in the economy is more than 60% in 1972 but it decreases to 13.06% in 2018.

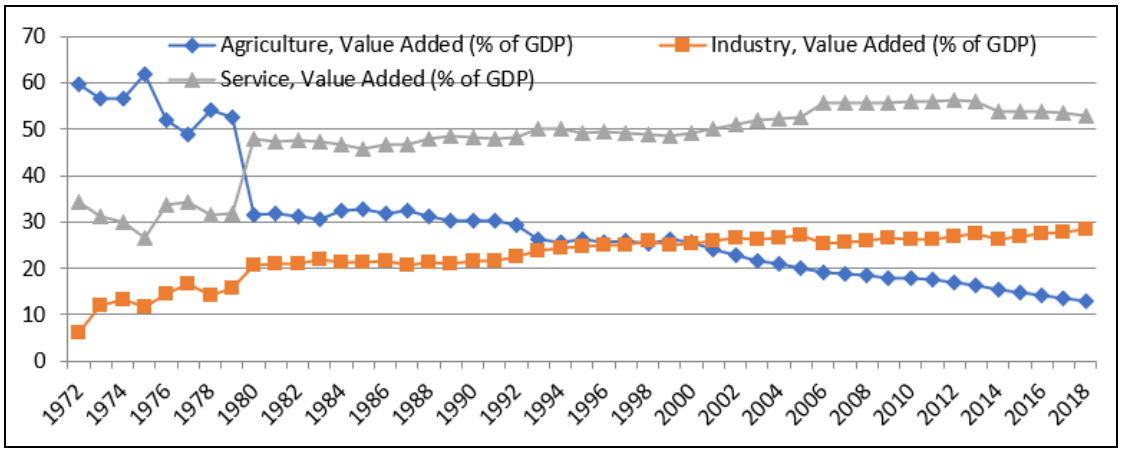

Figure 3: Sector-Wise Value Added to the Economy in Bangladesh, 1972-2018
Source: World Bank, WDI (2019)

From figure-3, the value-added industry, on the other hand, has multiplied more than four times since early 1972 to about 28.54%. Services have steadily value-added to about 34% of the economy from 1972 to 52.96% in 2018. The economic development during the past couple of decades has occurred nearly evenly in the industry and services sectors. Services start contributing to development only in the current decade. However, the contribution percentages from both industry and services are increasing. From 1972 to 2018, the contribution from the service sector has almost been twice. Besides, the industrial sector contribution increases a lot.

4.2. Sector-Wise Contribution to GDP from Different Economies

Sector-wise contributions to GDP of seven different countries have been shown in Table 3. From the Table, it is seen that every country has different characteristics in its economy. China is an emerging economy; India is a neighboring south Asian big market size; Lesotho is an African Least Developed Country; Malaysia is a developing Asian economy; the United Arab Emirates is a Middle Eastern country, and the United States of America is a developed economy in the world.

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From Table 3, it is observed that the contribution of the service sector to GDP is the highest in the developed economy e.g. the USA which is 80.2%. For the rest of the countries, it is 51.6% in China, 61.5% in India, 59.9% in Lesotho, 56.2% in Malaysia, and 49.2 in UAE. So, we can say that the developed economy (USA) tend to more emphasize on service and less on the agricultural sector. China (emerging economy) and Malaysia (developing economy) have an almost similar composition in GDP. Middle Eastern country, UAE relies almost equally on the service and industrial sector. Their contribution to GDP is almost 99.2%. Bangladesh, India, and Lesotho have an almost similar composition in GDP (WDI, 2019).

Table 3: Sector Contribution to GDP (%) from Different Economy 2019

Sector	Bangladesh	China	India	Lesotho	Malaysia	UAE	USA
Agriculture	13.07	7.9	15.4	8.3	7.1	0.9	0.09
Industry	28.54	40.5	23	31.8	36.8	49.8	18.9
Service	52.96	51.6	61.5	59.9	56.2	49.2	80.2

Source: Wikipedia (2019), WDI (2019)

5. DETERMINANTS OF ECONOMIC GROWTH OF BANGLADESH

Like other developing countries, the policies of Bangladesh primarily emphasize high and sustainable economic growth. However, to achieve and sustain a high growth rate, the policymakers of the country need to understand the influential determinants of growth and economic development such as the satisfactory role of agriculture, industrial development, and impressive extension of the labor-intensive RMG export sector. Bangladesh is the leading leader in RMG exports after China in the world. Another important component of the development of the economy is inflows of high remittances, which play a significant role in GDP.

5.1. Economic Determinants

Capital accumulation, labor force, and technology or infrastructure developments are considered as economic determinants of growth in this section.

5.1.1. Capital Accumulation

Capital accumulation is one of the most important determinants of economic growth and development for an economy. If the capital accumulation of a country is high, its production capacity will also be rich. However, capital accumulation depends on the saving rate which promotes capital investment. Generally, mills, factories, industries, buildings, machinery, other materials equipment, and vehicles of transportation are considered as the physical capital of a country.

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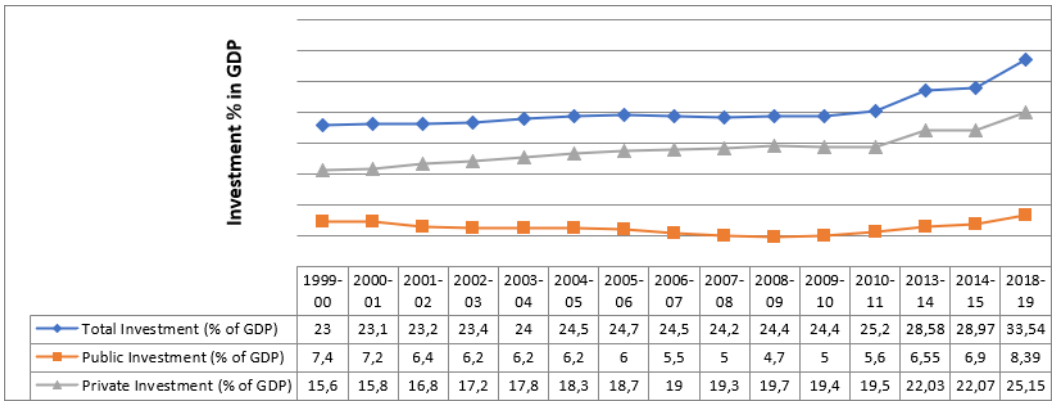
According to neoclassical and endogenous growth theory investment is an important component of economic development which can be done in two ways such as domestic and foreign investment. Whereas developing countries like Bangladesh have a shortage of capital, foreign investment is very necessary for economic development.

However, according to the neoclassical theorists, the investment casts an ample impact on the transitional area, whereas the view of endogenous growth theorists for more permanent or long-run effects. The empirical relationship between investment and economic growth have examined by Podrecca and Carmeci (2001), Sala-I-Martin (1997), Easterly (1997), Barro and Sala-I-Martin (1995), Mankiw et al. (1992), and Kormendi and Meguire (1985). Most researchers have found that investment is a significant component to accelerate the economic growth of any economy. Nevertheless, findings are not conclusive.

The investment scenario of the country is presented in Figure 4. It is observed that the economy is private driven where the participation of the private firms is two-thirds of the total investment.



	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2013-14	2014-15	2018-19
Total Investment (% of GDP)	23	23,1	23,2	23,4	24	24,5	24,7	24,5	24,2	24,4	24,4	25,2	28,58	28,97	33,54
Public Investment (% of GDP)	7,4	7,2	6,4	6,2	6,2	6,2	6	5,5	5	4,7	5	5,6	6,55	6,9	8,39
Private Investment (% of GDP)	15,6	15,8	16,8	17,2	17,8	18,3	18,7	19	19,3	19,7	19,4	19,5	22,03	22,07	25,15

Figure 4: Public, Private and Total Investment in Bangladesh
Source: Bangladesh Economic Review, MOF (2019)

From Figure 4, it is also provided that as the ratio of investment/GDP, public investment has been in the share of 7.4% in 1999-2000 to 8.38% in 2018-19. Total investment in Bangladesh in 1974 was only 10% of GDP which has increased to 33.54% of GDP in 2018-19. The economic growth of any country depends on capital accumulation because it is the engine of all development. The capital accumulation accelerates the national production through agriculture, industry, and export-oriented ready-made garments (RMG) sector which plays an influential role in building infrastructure and creating human resources.

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According to the World Bank's Logistic Performance Index 2018, Bangladesh ranks 100 out of 160 countries (in 2010 and 2014, its positions were 79 and 108 respectively) whereas China, Malaysia, India, and Vietnam rank 26, 41, 44 and 39 respectively. And among all the emerging Asian countries showed in Figure 6, the position of Bangladesh is the worst. But the performance of Bangladesh is better than that of Afghanistan, Bhutan, Maldives, Myanmar, and Nepal. Among South Asian countries, the position of Bangladesh (87) is third, only next to India and Pakistan.

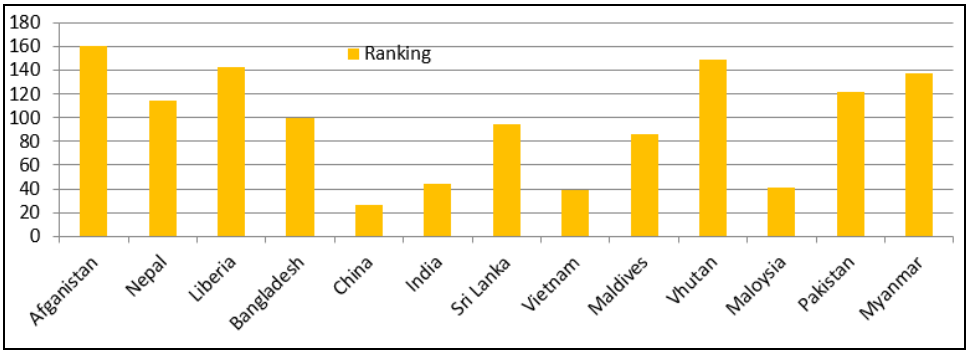

Figure 5: The World Logistics Performance Index 2018 (Out of 160 Countries)
Source: World Bank (2019), LPI-2018

The savings rate expanded from a low of 10% of GDP in 1977 to 38.24% in 2018. If we compare the saving performance of Bangladesh with other developing and emerging countries, we can observe that this sector is a chief factor in economic development. Figure 6 depicts the contributions of savings to GDP of different Asian countries. It is found that in 1982, the gross savings as a percent of GDP in Bangladesh was 16 only.

But for China, India, Pakistan, and Sri Lanka, it was 47%, 30.73%, 20.10%, and 34.03% respectively. Finally, in 2018, the contribution of gross savings as a percent of GDP for Bangladesh is 38.24%. Therefore, in Bangladesh, the ratio increased from 16% to 38.24% from 1980 to 2018 and her position is second in the selected Asian countries.

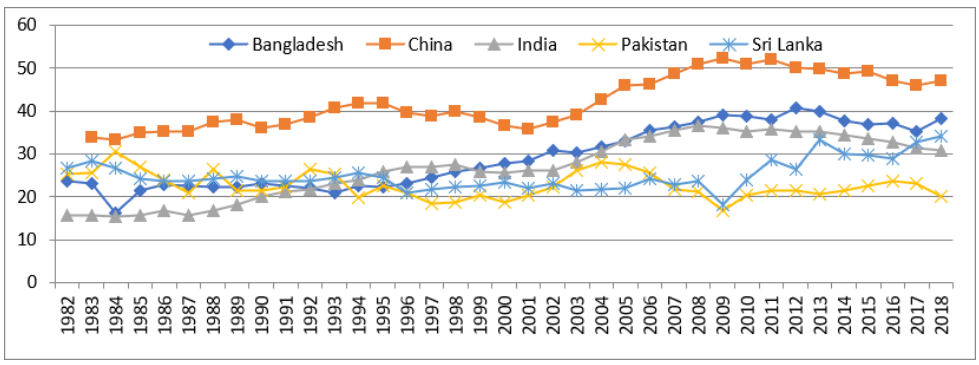

Figure 6: Gross Savings Rate (Percent of GDP) in Selected Countries, 1982 to 2018
Source: World Bank-WDI, 2019

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5.1.2. Labor Force

Another most important determinant of economic growth is the labor force. Figure 8 shows that labor force participation in Bangladesh is increasing. In 1990, it was 34585841 ((total labor force) whereas, in 2018, it turned to 67901053 (total labor force) through the participation of women in the labor force is not equal to that of man. The goal of a country is to turn its labor force to human capital. Human capital can be estimated in terms of education level and health status of the citizens.

Human capital presents the capacity and skill of people to transform raw materials and capital into goods and services, and the consensus is that these skills can be achieved through the educational system. Besides its instrumental value, human capital development is important for improvement for its intrinsic value as a development goal in its own right (Majumder, 2019; Son, 2010).

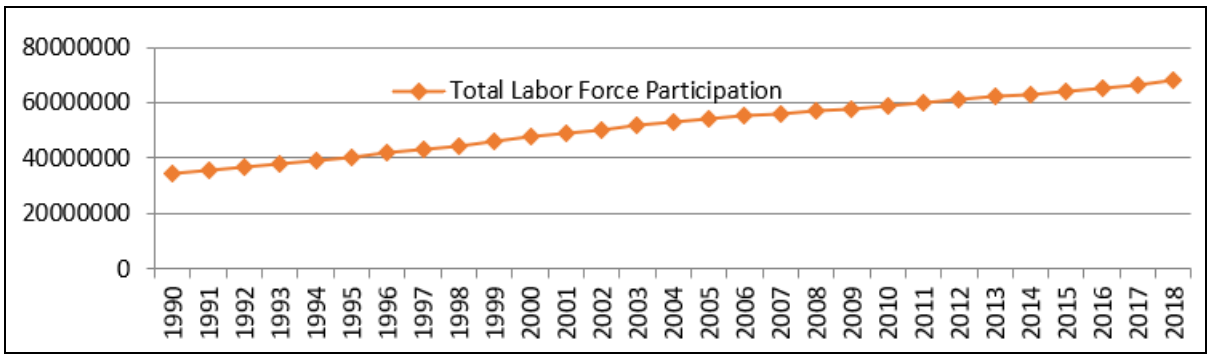

Figure 7: Total Labor Force Participation in Bangladesh, 1990-2018 (HeadCount)
Sources: World Development Indicators (WDI), World Bank (2019)

There are several theories in which the initial values of human capital resources and per capita GDP matter for eventual growth rates that indicate a relationship with physical investment and fertility (Barro, 1991). The researcher also suggests that economies with better human capital also have a low level of fertility rates and generate higher ratios of investment to GDP.

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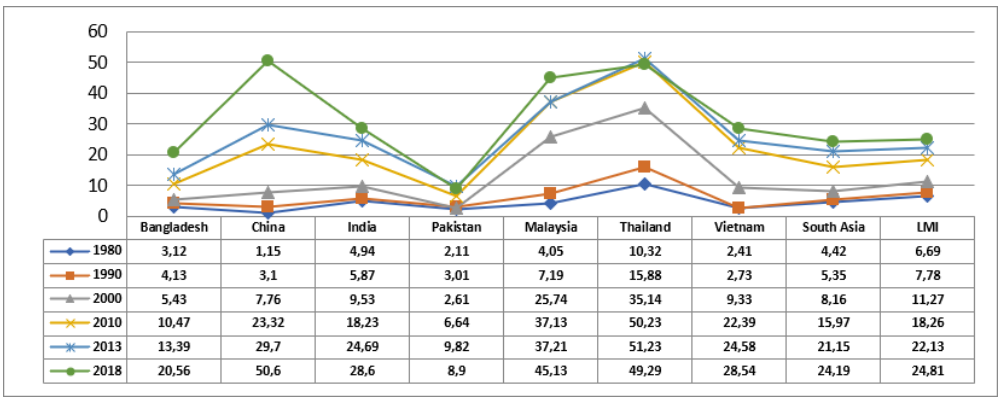

	Bangladesh	China	India	Pakistan	Malaysia	Thailand	Vietnam	South Asia	LMI
1980	3,12	1,15	4,94	2,11	4,05	10,32	2,41	4,42	6,69
1990	4,13	3,1	5,87	3,01	7,19	15,88	2,73	5,35	7,78
2000	5,43	7,76	9,53	2,61	25,74	35,14	9,33	8,16	11,27
2010	10,47	23,32	18,23	6,64	37,13	50,23	22,39	15,97	18,26
2013	13,39	29,7	24,69	9,82	37,21	51,23	24,58	21,15	22,13
2018	20,56	50,6	28,6	8,9	45,13	49,29	28,54	24,19	24,81

Figure 8: Gross Enrolment Ratio, Tertiary, Both Sexes (%) in Some Selected Countries
Source: World Bank (2019), Trading Economics (2019)

It is known that education is not only a fundamental right of the citizens but also one of the most basic paths people can achieve well-being in the long-run of their life. High-quality education and training and technical knowledge increase lifetime earnings through which individuals can participate and contribute to society and the overall economy of the country. Investment in education brings about the utmost positive change and benefits to individuals and societies environmentally and economically.

From Figure 8, it is observed that from 2013 to 2018, the gross enrollment ratio in the tertiary level of education in Bangladesh has increased by almost 7% whereas for China it is 22%, for India 5%, for Malaysia 11%, and for Vietnam 4%. This trend refers to be continuing most significantly in East and North-East Asian regions, where gross enrollment rates increased from 13% in 1999 to over 35% in 2018 (ESCAP, 2018).

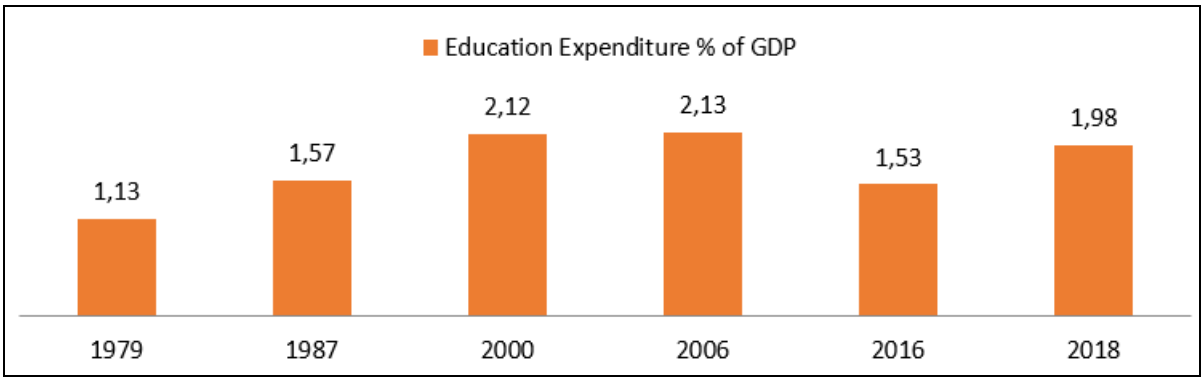

Figure 9: Government Expenditure on Education in Bangladesh (% of GDP)
Source: World Bank, WDI (2019)

As a result, in 2018, the percentage of enrollment in Bangladesh is several times lower than that of those countries. This is due to the fact that the education sector in Bangladesh has suffered from sustained under financing. The share of only individual education sector spending in the national budget and GDP has declined steeply since 2006 (Figure 9).

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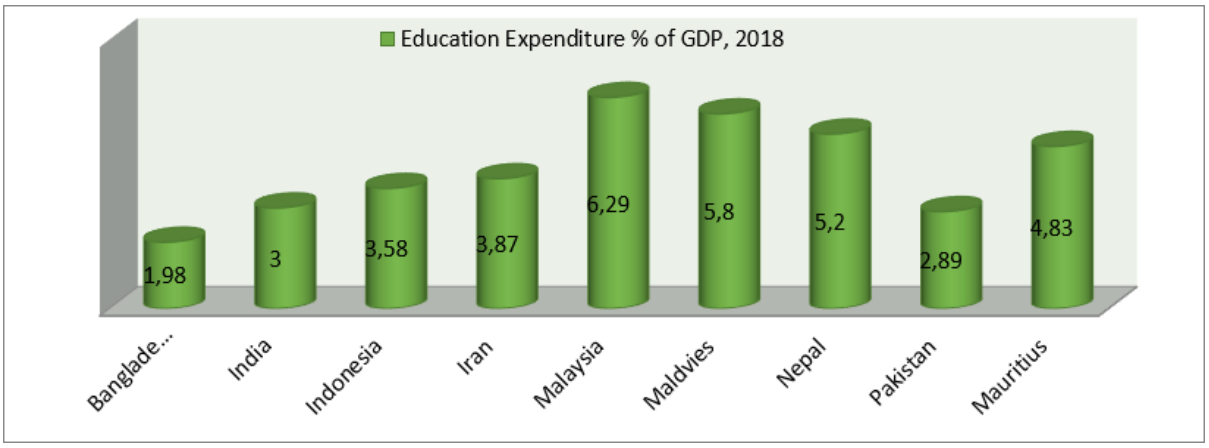

Figure 10: Government Expenditure on Education in Selected Asian Countries (% of GDP) in 2018
Source: World Bank, WDI (2019)

5.1.3. Infrastructure

Infrastructure is the key indicator for the development of any economy. Transportation and communication, information and telecommunications, energy and power development**,** water supply, and sewerage system, good health status, safety, and secure housing, and better educational facilities have become part and parcel of human existence. It contributes a lot to the promotion of economic development and thereby helps to eliminate economic discrimination and inequality, poverty, and deprivations in a country.

The investments in infrastructural development such as in transportation sector (e.g., roads and highways, railways, seaports, and civil aviation), power and energy, irrigation, watersheds, hydroelectric works, scientific applied research and training, markets and warehousing, communications and informatics, modernization of education, sound health and family welfare play a strategic role. In fact, visible infrastructure development refers to two parts; one is economic infrastructures, for example, finance and banking system meaning that e-banking, information and telecommunications, roads, irrigation and electricity; and another one is social infrastructure such as water supply, sewage systems, hospitals, family welfare, cultural activities, sports, and school facilities.

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Table 4: Some Selected Asian Countries Infrastructure Quality (2018-19)

Country	Infrastructure Quality, Overall (Out of 141)	Infrastructure Development of Rail	Infrastructure Development of Port	Infrastructure Development of Air	Quality of electricity supply	Mobile telephone subscriptions/100 pop
Bangladesh	3.1 (105)	3.2	3.5	3.8	10.7	97.3
India	4.5 (68)	4.1	4.5	4.9	17.6	86.9
China	4.6 (28)	4.5	4.6	4.5	4.9	115
Malaysia	5.6 (16)	5.1	5.6	5.7	5.8	148.8
Nepal	2.9 (108)	N/A	2.0	3.2	22,0	139.4
Pakistan	4,0 (110)	3.8	4.1	4.2	15.6	72.6
Philippines	3.7 (64)	2.4	3.7	3.7	9.1	110.1
Sri Lanka	3.9 (84)	3.8	4.1	4.6	7.0	115.1

Source: World Economic Forum 2018-2019: Global Competitiveness Report 2019

Table 4 shows that the overall infrastructure quality position of Bangladesh is 105 out of 141 countries. It is observed that the overall infrastructure quality of Bangladesh is lower than all other countries mentioned in the table except Nepal and Pakistan. Out of five South Asian countries, the position of Bangladesh is four which indicates the present scenario of the infrastructure facilities in the country. A lower value means a poor condition or underdeveloped infrastructure quality and higher value indicates a better and efficient level of infrastructure.

5.2. Non-Economic Determinants of Economic Growth

In this sub-section political environment and governance and institutional quality are considered as non-economic determinants of growth in Bangladesh.

5.2.1. Governance and Institutional Quality

Good governance is a significant factor to accelerate the social and economic development of any country. It is the pre-condition for the sustainable development of any economy. The overall performance of the government organs in Bangladesh is very poor which negatively affects the development of the economy. Institutional quality such as law and order and government effectiveness ensures the transparency and accountability of the institutions. Kaufman et al. (1999) were defined governance as the traditions and institutions by which the authority in a country is exercised. Good governance denotes independent judiciary and legislation, fair and transparent laws and order with unbiased enforcement, proper public financial information, and high public trust (Li, 2005).

The governance indicators of Table 5 show that the rank of the selected South Asian countries where the position of Bangladesh is very low except for Afghanistan, in these six

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components of good governances. The table also presents that on the basis of corruption perception index the score of Bangladesh is only better than Afghanistan. If developing countries like Bangladesh could ensure good governance, the trend of development would have been more intense. If good governance is established with the present progress of Bangladesh, the economic development would have accelerated further.

To continue the current development process of the country, the rule of law, stable political environment, and control of corruption should executive properly. The lack of political commitment fails to control the rapid corruption of the country. Besides, the inefficiency of the government of Bangladesh is also responsible for this corruption. Table 5 shows that the performance of the government's effectiveness of Bangladesh is lower than that of Bhutan, India, Pakistan, and Sri Lanka.

Table 5: Bangladesh & Some Selected Countries Governance Performance & CPI Score, 2017-2018

	TI 2017**	Worldwide Governance Indicators 2017*					
Country	CPI Score (Position, Out of 180)	Voice Accountability	Political Stability & Absence of Violence	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Afghanistan	15 (177)	-1.09	-2.75	- 1.22	-1.33	-1.62	-1.56
Bangladesh	28 (143)	-0.56	-1.24	- 0.69	-0.80	-0.59	-0.80
Bhutan	67 (26)	-0.05	0.99	0.49	-0.67	0.47	1.14
India	40 (81)	0.41	-0.95	0.10	-0.31	-0.07	-0.30
Myanmar	30 (130)	-0.85	-0.63	- 0.98	-0.87	-0.99	-0.65
Nepal	31 (122)	-0.23	-0.79	- 0.81	-0.76	-0.84	-0.76
Pakistan	32 (117)	-0.69	-2.47	- 0.64	-0.64	-0.83	-0.86
Sri Lanka	38 (91)	-0.11	-0.07	- 0.21	-0.10	-0.01	-0.28

*Measures of governance indicators where -2.5 is poor or weak and 2.5 is strong or better governance performance, ** TI CPI Score ranges between 0 (Most Corrupt) and 100 (Least Corrupt)
Source: World Bank (2018) and Transparency International, 2018

6. ECONOMETRIC MODEL SPECIFICATION

To examine the factors which influence the economic growth of the country using multivariate OLS regression models are the following.

The econometric model-1 of the sector contribution to real GDP is:

$$GDP = f(Agriculture, Industry, Service\ Sector) \quad (1)$$

$$RGDP_t = \alpha_0 + \alpha_1 Agri_t + \alpha_2 Indus_t + \alpha_3 Ser_t + \varepsilon_t \quad (2)$$

Taking Log on both sides of the model

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$$Ln(RGDP)_t = \alpha_0 + \alpha_1 Ln(Agri)_t + \alpha_2 Ln(Indus)_t + \alpha_3 Ln(Ser)_t + \varepsilon_t \quad (3)$$

Where $RGDP$ means the real gross domestic product (constant 2010 US$) is used to present the economic growth of the country. $Agriculture$ represents the agriculture, forestry and fishing value added (constant 2010 US$), $Industry$ shows industry including construction value added (constant 2010 US$), and $Service\ Sector$ demonstrates the value-added of the service sector (constant 2010 US$). The duration of the study is 1972 to 2018 for Model-1 where all variables are annual time series data which is presented by t. α_0 to α_3 are coefficients which will be estimated. The error term is presented by ε_t.

The econometric Model-2 of the employment effects is:

$$GDP = f(Employment\ in\ Agriculture, industry\ and\ Domestic\ Investment) \quad (4)$$

$$RGDP_t = \beta_0 + \beta_1 EmployAgri_t + \beta_2 EmployIndus_t + \beta_3 DI_t + \epsilon_t \quad (5)$$

Taking Log on both sides of the model

$$Ln(RGDP)_t = \beta_0 + \beta_1 Ln(EmployAgri)_t + \beta_2 Ln(EmployIndus)_t + \beta_3 Ln(DI)_t + \epsilon_t \quad (6)$$

Where, $EmployAgri$ presents the employment in the agriculture sector (% of total employment, ILO estimate). $EmployIndus$ means employment in the industrial sector (% of total employment, ILO estimate). DI shows the domestic investment (% of GDP). The time period of the study is available from 1991 to 2018 which is presented by t. β_0 to β_3 will be estimated. The disturbance term is shown by ϵ_t.

The econometric model-3 of the economic determinants is:

$$GDP = f\begin{pmatrix} Capital, Labor\ Forces, Infrastructure, Exports, \\ Imports, total\ Reserve \end{pmatrix} \quad (7)$$

$$RGDP_t = \gamma_0 + \gamma_1 C_t + \gamma_2 LF_t + \gamma_3 Infra_t + \gamma_4 Ex_t + \gamma_5 Im_t + \gamma_6 TR_t + \theta_t \quad (8)$$

Taking Log on both sides of the model

$$Ln(RGDP)_t = \gamma_0 + \gamma_1 Ln(C)_t + \gamma_2 Ln(LF)_t + \gamma_3 Ln(Infra)_t + \gamma_4 Ln(Ex)_t + \gamma_5 Ln(Im)_t + \gamma_6 Ln(TR)_t + \theta_t \quad (9)$$

Where, C, LF, $Infra$, Ex, Im, and TR denote the capital (Broad money, % of GDP), labor forces (population, ages 15 to 64 total), infrastructure development (telephone line subscription per 100 people), exports of goods and services (% of GDP), imports of goods and services (% of GDP), and total reserves (includes gold, current US$) respectively. Here, t

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presents the observation i.e., 1, 2, 3, …, 46 which is started 1972 to 2018. The coefficients of this model are shown by γ_s which will be estimated. θ_t is a white noise error term.

The econometric model-4 of the non-economic determinants to influence the real GDP is:

$$GDP = f(Control\ of\ Corruption, Bureaucratic\ Quality, Internal\ Conflict, Democratic\ Accountability, Rule\ and\ Order) \quad (10)$$

$$RGDP_t = \delta_0 + \delta_1 CC_t + \delta_2 BQ_t + \delta_3 IC_t + \delta_4 DA_t + \delta_5 RO_t + \vartheta_t \quad (11)$$

Taking Log on both sides of the model

$$Ln(RGDP)_t = \delta_0 + \delta_1 Ln(CC)_t + \delta_2 Ln(BQ)_t + \delta_3 Ln(IC)_t + \delta_4 Ln(DA)_t + \delta_5 Ln(RO)_t + \vartheta_t \quad (12)$$

Where, , and RO illustrate the control of corruption, bureaucratic quality, internal conflict, democratic accountability, and rule and order situation respectively. The duration of the study is 1984 to 2018. The time duration of this model depends on the availability of the data. Here, all variables are annual time series data. δ_0 to δ_4 are coefficients to be estimated. ϑ_t denotes the residuals of the model.

7. ECONOMETRICS RESULTS ANALYSIS

The empirical results are presented in Table 6. The independent variables capital, labor forces, infrastructure, exports, imports, and total reserves of the country are used as economic determinants and control of corruption, bureaucratic quality, rule and order situation, internal conflict, democratic accountability are employed as non-economic determinants of the economic growth of Bangladesh. This study employs multivariate OLS regression and GLM to explore these influences on the economic development of the country. The necessary law for employing GLM technique is to generalize and error distributions of the models for betterment of normal distributions.

The OLS results show that agriculture, industry, and service sector contribution to real GDP are positive where industry and service sectors are statistically significant at a 1% level respectively. Industry and service sector contributions are the most influential factors in the economic growth of the country. This result shows that if the contribution of industry and service sector rises the real GDP also increases. The model is nicely fitted because its goodness of fit (R squire) is almost 0.90 meaning that the explanatory variables are able to explain the

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dependent variable. The diagnostic tests in Table 7 suggest that the model has no serial correlation, no heteroscedasticity problem, and normally distributed. Figure 11 presents the CUSUM and CUSUMSQ tests to confirm the stability of the model.

On the basis of the employment level, it is seen that in the sector-wise contribution the coefficient of agriculture, industry, and domestic investment are positively significant. Bangladesh is going to an industrial economy. If 1 percent increases employment in the industrial sector the GDP accelerates by 0.65 percent. The agriculture and industry sectors and services also are the major fields for employment in the country. Domestic investment is also positive to influence economic growth which is statistically significant at a 1% level. So, local investment is the main determinant of the economic development of the country. This model is also reliable because it meets the all requirements of the diagnostic tests which are presented in the lower part of Table 6.

The results of the economic determinant model illustrate that the capital, labor forces, imports, infrastructure, and total reserve of the country positively influences the economic development of the country where the capital, imports, labor forces, and total reserve are statistically significant. Capital, labor forces, and total reserve of the country are the vital economic determinants of economic growth meaning that if these determinants increase at the same time real GDP will also increase. Infrastructure development needs more attention meaning that there are shortages of investment in this sector. The goodness of fit is 0.89 which is the best-fitted model. The D-W value is higher than the goodness of fit R^2 ensures that the model doesn't have any spurious problem. The model doesn't have any serial correlation, it is normally distributed and no heteroscedasticity problem. The model is also a stable checking by CUSUM and CUSUMSQ tests.

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Table 6: OLS Regression Results of the Multivariate Models

Variables	Model-1	Model-2	Model-3	Model-4
Real GDP (Dependent Variable)				
Real Agricultural Contribution	0.43			
Employment in Agriculture		-0.47		
Real Industrial Contribution	0.657***			
Employment in Industry		0.61***		
Real Service Sector Contribution	1.56***			
Domestic Investment		1.33***		
Capital			0.25***	
Labor Forces			1.63***	
Export			0.10*	
Import			0,43***	
Infrastructure			-0.02	
Total Reserve			0.04**	
Control of Corruption				3.16***
Bureaucratic Quality				1.33***
Internal Conflict				-5.64***
Democratic Accountability				-1.76
Rule and Order				-1.15*
Constant	-1.61	21.21***	-1.15**	5.83***
R^2	0.899	0.90	0.89	0.861
Adjusted R^2	0.88	0.89	0.87	0.83
F-Statistic (P-Value)	63938***	75.673***	1488.92***	28.72***
D-W Value	1.014	1.60	1.094	1.707

Note: *, **, *** means 10%, 5% and 1% level of significance.

The coefficients of non-economic determinants such as control of corruption and bureaucratic quality are positively significant to influence the economy. Control of corruption and quality of bureaucracy positively helps to accelerate the economic growth of the country. Policymakers should attention to control corruption. The results of other non-economic determinants also present that internal conflict, democratic accountability, and rule and order situation negatively affects the economic growth in Bangladesh. These empirical findings are consistent with the exploratory research.

Table 7: Diagnostic Test

Diagnostic Test				
Test	Model-1	Model2	Model-3	Model-4
Serial Correlation Test	0.243	0.124	0.321	0.127
Normality Test	0.414	0.324	0.430	0.379
Heteroscedasticity Test	0.204	0.349	0.241	0.101
CUSUM	Stable	Stable	Stable	Stable
CUSUMSQ	Stable	Stable	Partial Stable	Stable

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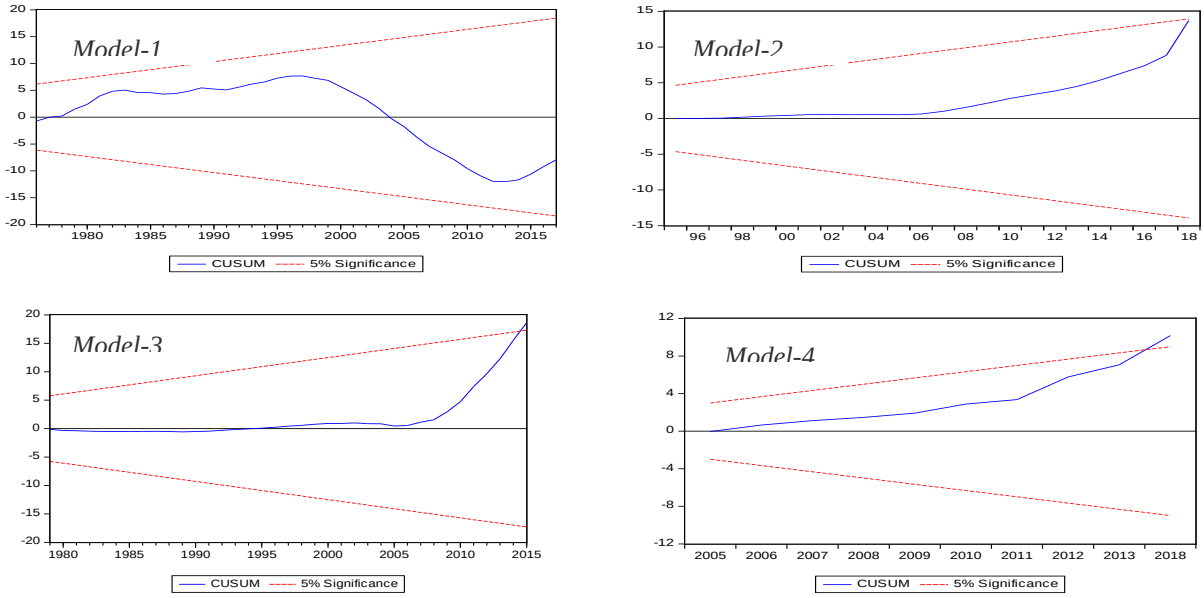

Figure 11: Stability Test (CUSUM Test)

The results of the GLM regression present in Table 8. In this section, infrastructure, exports, import capital, labor forces, and total reserves of the country are used as economic determinants and control of corruption, bureaucratic quality, rule and order situation, internal conflict, democratic accountability are employed as non-economic determinants of the economic growth of Bangladesh. Whatever, the GLM Estimated result shows that agriculture, industry, and service sector support to accelerate the GDP growth in positive and significant at 1% level.

Model-2 presents that employment in the industrial sector and domestic investment enhance the GDP growth. If 1 percent increases domestic investment and employment in the industrial sector the GDP accelerates in 1.33% and 0.61% respectively. Employment in the agriculture sector has a negative and insignificant relation with GDP. Model-3 presents that capital, labor force, and import have a positive impact on GDP enhancement with a 1% significance level. Export and a total reserve have a positive and significant relation to GDP growth with 10% and 5% level respectively. The non-economic determinants present in Model-4, this gives the consistent result as determinants of economic growth. The diagnostic test for estimated GLM has presented in Figure-11.

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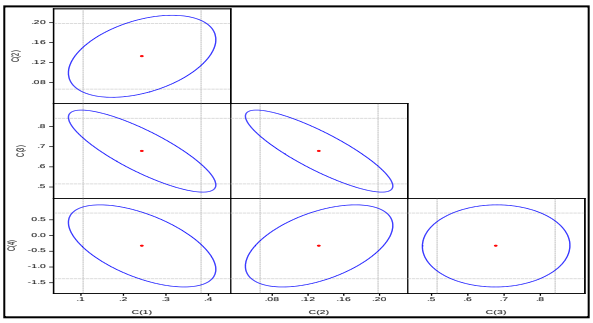
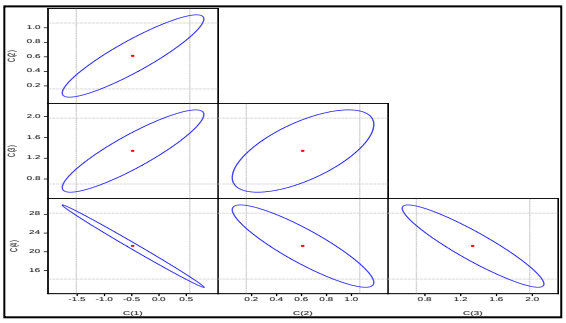
Table 8: GLM Regression Results of the Multivariate Models

Variables	Model-1	Model-2	Model-3	Model-4
Real GDP (Dependent Variable)				
Real Agricultural Contribution	0.24***			
Employment in Agriculture		-0.47		
Real Industrial Contribution	0.13***			
Employment in Industry		0.61***		
Real Service Sector Contribution	0.67***			
Domestic Investment		1.33***		
Capital			0.26***	
Labor Forces			1.63***	
Export			0.11*	
Import			0,43***	
Infrastructure			-0.02	
Total Reserve			0.05**	
Control of Corruption				8.36***
Bureaucratic Quality				-1.96***
Internal Conflict				1.26
Democratic Accountability				-1.08***
Rule and Order				1.92***
Constant	-0.33	-21.21***	-5.94	1.86***
LR Statistics	55349.39***	710.77***	3342.13***	55.32***

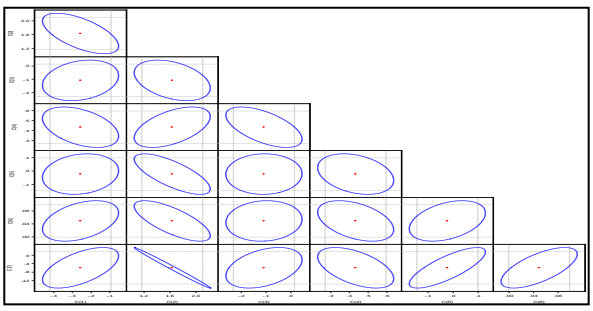
Note: *, **, *** means 10%, 5% and 1% level of significance.



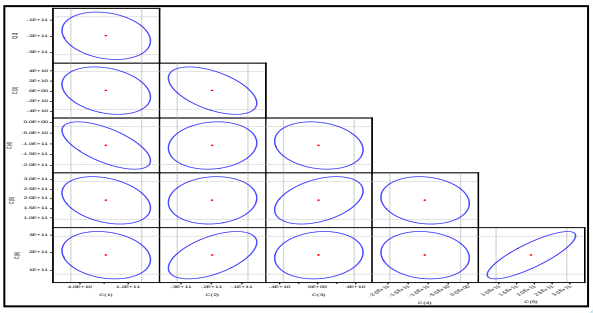
Model-1



Model-2



Model-3



Model-4

Figure 11: Diagnostic Test for GLM: Confidence Ellipse Criteria

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DOI: 10.14807/ijmp.v13i2.1545

Confidence Ellipse Criteria assume 95% confidence interval and the level of significance is 5%. The estimate diagram shows the consistency of models. There is no inconsistency in those models which are estimated by using GLM technique.

8. CONCLUSION AND RECOMMENDATIONS

At present, Bangladesh is a growing developing economy and lower-middle-income country in the South Asian region. The country experienced steady economic growth in the 2000s and boosted its per capita income. It was merely 3.33% in 1973 which increased to 8.13 % by 2019. And per capita income increased from the only US $91.49 to the US $1314 over the years. Now in 2019, the per capita income of the country is US $1906. The economic growth of the country has remained around 6.5% for more than a decade. In 2018-2019, the growth rate has reached to 7.86% where it was 7.28% in 2016-2017.

The economy of the country is market-based which is increasingly led by export-oriented industries. Bangladesh is classified as a Next-11 emerging market and one of the Frontier Five. It is widely recognized that Bangladesh is doing better according to some socio-economic development indicators such as remarkable reduction of infant mortality, increased life expectancy, labor participation especially women participation in the labor force, decreased population growth rate, increase in GDP per capita, and expansion of total urbanization.

The independent variables capital, labor forces, infrastructure, exports, imports, and total reserves of the country are used as economic determinants and control of corruption, bureaucratic quality, rule and order situation, internal conflict, democratic accountability are employed as non-economic determinants of the economic growth of Bangladesh. This research employs the multivariate OLS regression and GLM method to explore these influences on the economic development of the country. The empirical results show that agriculture, industry, and service sector contribution to real GDP are positive where industry and service sectors are statistically significant at a 1% level respectively. Similar kind of result found by (Rahman et al., 2011; Alam et al., 2009; Ferdousi & Dehai, 2014; Nuruzzaman, 2004).

On the basis of the employment level in the sector-wise contribution, the coefficient of agriculture, industry, and domestic investment is positively significant. The results of the economic determinants model illustrate that the capital, labor forces, imports, infrastructure, and total reserve of the country positively influences the economic development of the country which are significant also. The coefficients of non-economic determinants such as control of

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corruption and bureaucratic quality are positively significant to influence the economy. The results also present that internal conflict, democratic accountability, and rule and order situation are negative effects the economic growth in Bangladesh. These empirical findings are consistent with the exploratory research.

The government has to take appropriate steps in the above matters. Firstly, the rule of law, control of corruption, and government efficiency in the country must be truly implemented then the people will gain confidence. Small, medium and large investors will have encourages to come forward. The cost of megaprojects of the infrastructure should be reduced and completed within the stipulated time. Then its benefits can be found. Above all, it has to have proceeded with specific policies for the development of human resources. Otherwise, it will not be possible to achieve the goal. The current study contributes to the economic theory and practices with a great addition in literature.

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